

Marine Climatological Elements

Precipitation

Of the elements recorded in the marine data base, precipitation is the one most subject to error in both the way it is observed and the way it is interpreted. For example, it is often inferred in the literature that ships often try to avoid foul weather and thereby bias the data towards fair weather with fewer precipitation observations. (Elms (1986) compared the Volunteer Observing Ship (VOS) data to other sources of data such as Ocean Station Vessel (OSV) and buoy data and concluded that there is little evidence that "fair weather bias" is a serious problem for most applications of marine climatic data. The 1982 international code change introduced a present weather indicator (ix) into the Ship Synoptic code FM13-VII and this change will probably be shown to bias the present weather categories more than any foul weather avoidance by ships. This is especially true between January 1982 and March 1985, if the data are not corrected for the missing ix code in the IMMT exchange format.)

Assessing oceanic rainfall data is a major problem because transit ships are unable to take quantitative precipitation measurements. A number of studies have been conducted in efforts to predict precipitation amounts, or rates of fall, based on estimates derived from the use of present weather observations from ships of opportunity (Goroch, et al., 1984) and readings from satellites (Rao, et al., 1976).

Throughout the Mediterranean basin, the percent frequency of precipitation is low. Yet, from the percent frequency of precipitation charts, it is easy to distinguish the classical, wet winter season from that of the dry summer one. During the summer, many areas around the Mediterranean Sea experience precipitation less than one percent of the time; this is especially true in the eastern half. In other sections, observed frequencies rarely exceed two to three percent. While winter brings a significant increase in the frequency of precipitation, especially for the eastern sections, frequencies are still below 10 percent. Slightly higher frequencies are observed in the Black Sea. During the winter, the driest region over the sea is along the eastern Iberian peninsula, where frequencies of reported precipitation average only 3 to 4 percent.

Air Temperature

Air temperature is one of the elements most frequently observed by mariners. On many ships the heating effect of the ship's structure has a tendency to produce higher than actual ambient air temperature readings because of instrument exposure. This is especially true under calm sunny conditions.

From September to April, the mean air temperature pattern is relatively zonal as temperatures increase from north to south. In January and February, average temperatures range from the mid-to-high 40's(°F) along the northern Mediterranean shores to near 60°F along the North African coast. At the height of winter in the Black Sea, mean air temperatures range from the mid 30's(°F) along the northern shores to the mid 40's(°F) along the southern shores.

By summer, the temperature pattern is somewhere between zonal and meridional with the average temperatures ranging from the upper 60's(°F) in the northwestern corner of the Mediterranean Sea to the mid 70's(°F) in the eastern end. Average temperatures during this time range from the upper 60's(°F) to the lower 70's(°F) across the Black Sea.

Sea-Surface Temperature

Sea-surface temperatures are recorded with a fairly high frequency in marine observations. The principle methods for sampling are intake thermometers and buckets. Even though the two methods can produce slightly different results, the data can be used with considerable confidence.

During winter the mean sea-surface temperature pattern never acquires the look of the strong zonal pattern characteristic of the mean air temperature. In fact its winter pattern more closely resembles the summer pattern of the mean air temperature. The summer pattern of mean sea-surface temperatures maintains a similarity to its wintertime pattern as the temperature values basically increase from their lowest values in the northwest corner to the highest in the eastern end. The summer season does introduce some anomalies to the pattern as cold regions are established at the Strait of Gibraltar and in the Aegean Sea.